

IN THE CLAIMS:

1-2. (Canceled)

3. (Currently Amended) A material comprising:

a sintered porous substrate comprised of a polymer and a functional additive and having a surface; wherein the surface comprises a region defined by at least some of the functional additive;
at least some of the functional additive
a spacer covalently bound to the region; and

a biological or chemical moiety covalently or non-covalently bound to the spacer.

4. (Original) The material of claim 3, wherein the surface comprises a plurality of regions defined by at least some of the functional additive, each of which is covalently bound to a spacer, which in turn is covalently or non-covalently bound to a biological moiety.

5. (Original) The material of claim 1 or 3, wherein the polymer is a polyolefin, polyether, nylon, polycarbonate, poly(ether sulfone), or a mixture thereof.

6. (Original) The material of claim 5, wherein the polyolefin is ethylene vinyl acetate; ethylene methyl acrylate; polyethylenes; polypropylenes; ethylene-propylene rubbers; ethylene-propylene-diene rubbers; poly(1-butene); polystyrene; poly(2-butene); poly(1-pentene); poly(2-pentene); poly(3-methyl-1-pentene); poly(4-methyl-1-pentene); 1,2-poly-1,3-butadiene; 1,4-poly-1,3-butadiene; polyisoprene; polychloroprene; poly(vinyl acetate); poly(vinylidene chloride); poly(tetrafluoroethylene) (PTFE); poly(vinylidene fluoride) (PVDF); acrylonitrile-butadiene-styrene (ABS); or a mixture thereof.

7. (Original) The material of claim 5, wherein the polyolefin is polyethylene or polypropylene.

8. (Currently Amended) The material of claim 5, wherein the polyether is polyether ether ketone (PEEK), (poly(oxy-1,4-phenylene-oxy-1,4-phenylene-carbonyl-1,4-phenylene)), polyether sulfone (PES), or a mixture thereof.

9. (Original) The material of claim 1 or 3, wherein the functional additive comprises a hydroxyl, carboxylic acid, anhydride, acyl halide, alkyl halide, aldehyde, alkene,

amide, amine, guanidine, malimide, thiol, sulfonate, sulfonic acid, sulfonyl ester, carbodiimide, ester, cyano, epoxide, proline, disulfide, imidazole, imide, imine, isocyanate, isothiocyanate, nitro, or azide functional group.

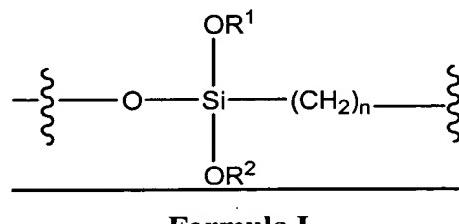
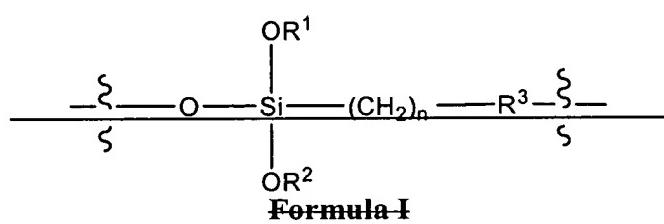
10. (Original) The material of claim 9, wherein the functional additive comprises a hydroxyl, amine, aldehyde, or carboxylic acid functional group.

11. (Original) The material of claim 10, wherein the functional additive comprises a hydroxyl functional group.

12. (Original) The material of claim 1 or 3, wherein the functional additive is silica powder, silica gel, chopped glass fiber, controlled porous glass (CPG), glass beads, ground glass fiber, glass bubbles, kaolin, alumina oxide, or a mixture thereof.

13. (Original) The material of claim 3, wherein the spacer is a silane, functionalized silane, diamine, alcohol, ester, glycol, anhydride, dialdehyde, terminal difunctionalized polyurethane, dione, macromer, or a multifunctional polymer.

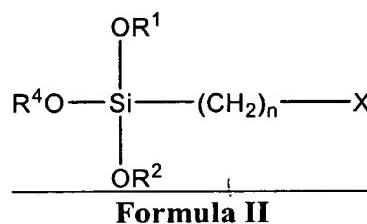
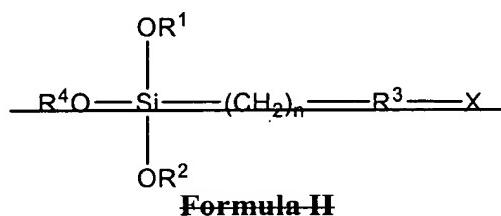
14. (Currently Amended) The material of claim 13, wherein the spacer ~~to which the porous substrate and biological or chemical moiety is attached~~ is of Formula I:



wherein ~~the substrate is bound to the oxygen atom and the chemical or biological moiety is bound to R³; R¹ and R² are each independently is hydrogen, substituted or unsubstituted alkyl, aryl, or aralkyl; R³ is a substituted or unsubstituted aliphatic chain or a bond; and n is an integer from about 1 to about 18.~~

15. (Original) The material of claim 1 or 3, wherein the chemical or biological moiety is a drug, hydrophilic moiety, catalyst, antibiotic, antibody, antimycotic, carbohydrate, cytokine, enzyme, glycoprotein, lipid, nucleic acid, nucleotide, oligonucleotide, peptide, protein, ligand, cell, ribozyme, or a combination thereof.

16. (Currently Amended) A material comprising:
~~coated or polymerized~~
~~coating activated and functional~~
~~a sintered porous polyethylene substrate having a surface in which a functional~~
~~additive has been embedded,~~
~~when the surface of the porous coating contains enzyme~~
~~functionalized by said functional additive~~
and a spacer precursor of Formula II covalently attached to at least a portion of said functional additive:

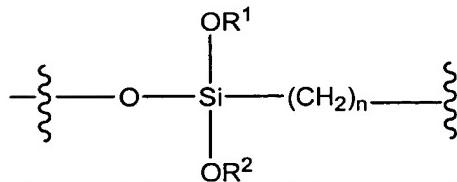
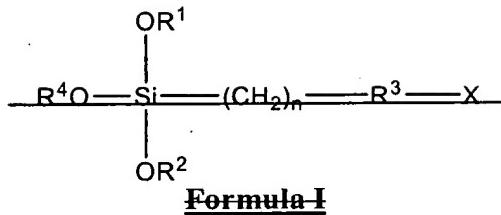


wherein R¹, R² and R⁴ are each independently is hydrogen, substituted or unsubstituted alkyl, aryl, or aralkyl; R³ is a substituted or unsubstituted aliphatic chain or a bond; n is an integer from about 1 to about 18; and X is OH, NH₂, CHO, CO₂H, NCO, or epoxy.

17. (Currently Amended) A material comprising:

a sintered, porous polyethylene substrate having a surface in which a functional additive has been embedded,

and a spacer of Formula I:



Formula I

wherein R R^1 and R' R^2 are each independently is hydrogen, substituted or unsubstituted alkyl, aryl, or aralkyl; R^3 is a substituted or unsubstituted aliphatic chain or a bond; and n is an integer from about 1 to about 18;

and wherein the spacer is covalently attached to at least a portion of said functional additive and to a chemical or biological moiety.

18. (Original) The material of claim 17, wherein the chemical or biological moiety is a nucleotide, oligonucleotide, polynucleotide, peptide, cell, ligand, or protein.

19. (Currently Amended) A method of providing a material which comprises:
forming a sintered, porous substrate comprised of a polymer and a functional additive and having a surface, wherein the surface comprises a region defined by at least some of the functional additive, wherein the region contains at least one functional group;

contacting the functional group with a spacer under reaction conditions suitable for the formation of a covalent bond between an atom of the functional group and an atom of the spacer; and

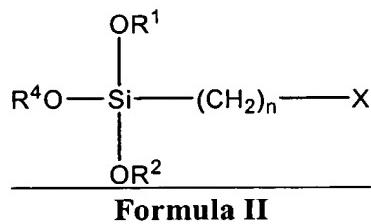
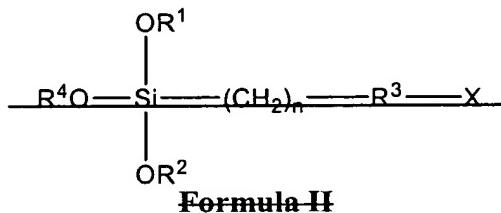
contacting the spacer with a chemical or biological moiety under reaction conditions suitable for the formation of a covalent or non-covalent bond between an atom of the spacer and an atom of the chemical or biological moiety.

20. (Original) The method of claim 19, wherein the functional group is hydroxyl, carboxylic acid, anhydride, acyl halide, alkyl halide, aldehyde, alkene, amide, amine, guanidine, malimide, thiol, sulfonate, sulfonic acid, sulfonyl ester, carbodiimide, ester, cyano,

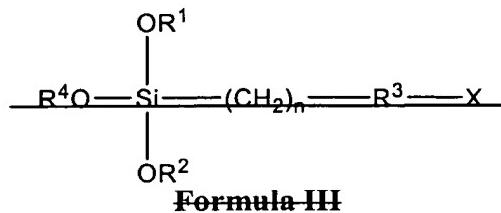
epoxide, proline, disulfide, imidazole, imide, imine, isocyanate, isothiocyanate, nitro, or azide.

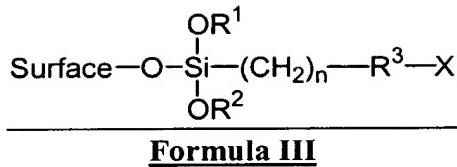
21. (Original) The method of claim 19, wherein the porous substrate is formed by sintering beads and then attaching the spacer, or attaching the spacer to beads prior to sintering the beads.

22. (Currently Amended) A method of providing a material which comprises: forming a sintered, porous substrate comprised of a polymer and a functional additive and having a surface, wherein the surface comprises a region defined by at least some of the functional additive, wherein the region contains at least one hydroxyl group; and contacting the hydroxyl group with a compound of Formula II:



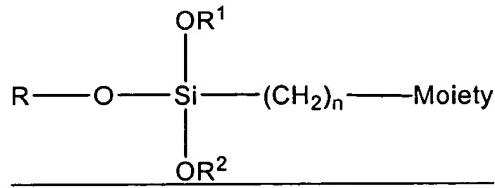
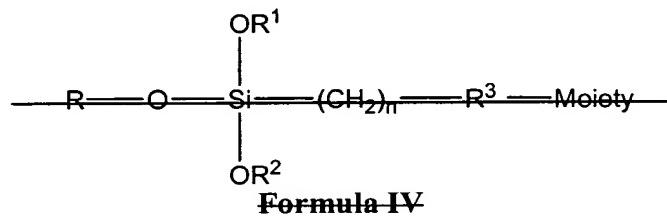
a
wherein each of R¹, R², and R⁴ each independently is hydrogen, substituted or unsubstituted alkyl, aryl, or aralkyl; R³ is a substituted or unsubstituted aliphatic chain or a bond; n is an integer from about 1 to about 18; and X is OH, NH₂, CHO, CO₂H, NCO, or epoxy under conditions suitable for the formation of a material of Formula III:





wherein Surface is the surface of the porous substrate.

23. (Currently Amended) The method of claim 22 wherein the material of Formula III is contacted with a chemical or biological moiety having an amine group if X is an aldehyde or carboxylic acid, or a chemical or biological moiety having an aldehyde or carboxylic acid group if X is an amine, under reaction conditions suitable for the formation of a material of Formula IV:



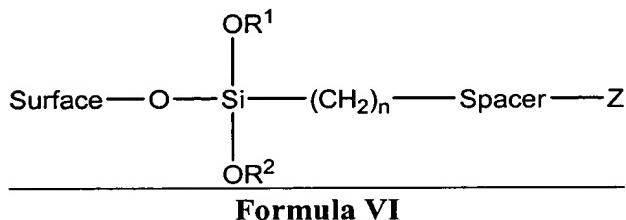
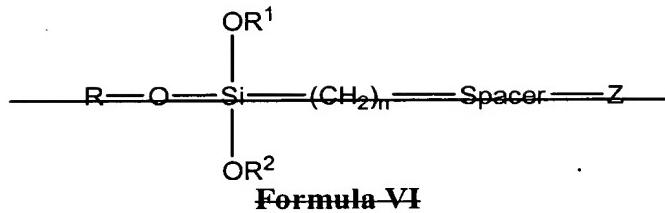
Formula IV

wherein Moiety is the chemical or biological moiety, and wherein Surface is the surface of the porous substrate.

24. (Currently Amended) The method of claim 22 wherein X is NH₂ in the material of Formula III, X is NH₂ and the material is contacted with a compound of Formula V:



wherein Spacer is a hydrophilic segment and Z is a terminal group capable of covalently or non-covalently bonding to proteins, amino acids, oligonucleotides, under reaction conditions suitable for the formation of a material of Formula VI:

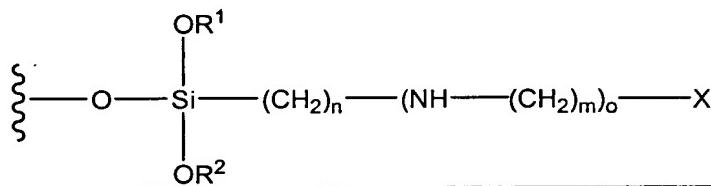
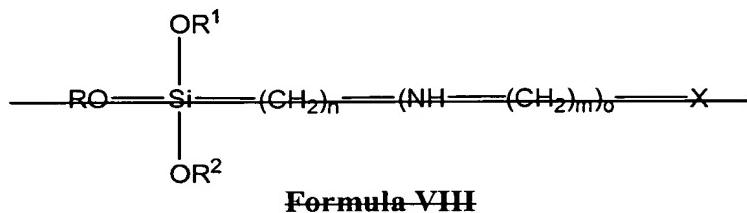


wherein R Surface is the surface of the porous substrate.

25. (Original) The method of claim 24, wherein Spacer is a hydrophilic polyurethane, polyethylene glycol, or polyelectrolyte and wherein Z is isocyanurate, aldehyde, amino, carboxylic acid, or N-hydroxysuccimide.

26-27 (Canceled)

28. (Currently Amended) The material of claim 13 wherein the spacer to which the porous substrate and biological or chemical moiety is attached is of Formula VIII:

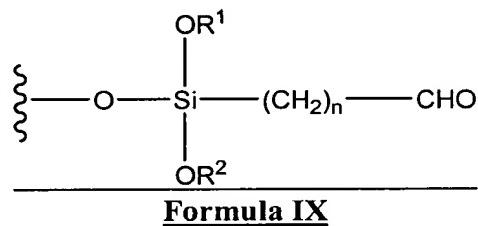
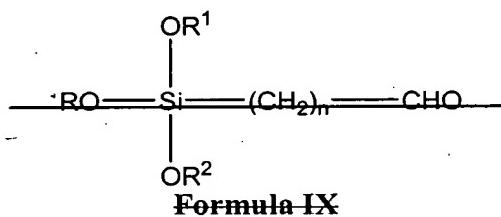


Formula VIII

wherein R is the surface of the porous substrate is bound to the oxygen atom; R^1 and R^2 each independently is hydrogen, substituted or unsubstituted alkyl, aryl, or aralkyl; X is OH, NH₂, CHO, CO₂H, NCO, or epoxy; n is an integer from about 1 to about 5; m is an integer from about 1 to about 5; and o is an integer from 0 to about 3.

29. (Original) The material of claim 25 wherein X is CHO or NH₂.

30. (Currently Amended) The material of claim 13 wherein the spacer to which
~~the porous substrate and biological or chemical moiety is attached~~ is of Formula IX:



wherein R is the surface of the porous substrate is bound to the oxygen atom; R¹ and R² each independently is hydrogen, substituted or unsubstituted alkyl, aryl, or aralkyl; and n is from about 1 to about 18.